

**REMARKS**

Original claims 1-21 and new claims 22-27 are all the claims pending in the application. Claims 3, 5, 8, 12, 15, and 19 are herein canceled. The patentable features of canceled dependent claims 3 and 5 have been incorporated into the independent claim

1. The patentable features of canceled dependent claims 8 and 12 have been incorporated into the independent claim 6. The patentable features of canceled dependent claims 15 and 19 have been incorporated into the independent claim 13. Claims 22-27 have been added herein; however, no new matter is added and all features recited in the newly added claims 22-27 are fully supported by the specification as filed.

Claims 1-21, stand rejected on prior art grounds and as being directed to non-statutory subject matter. Applicants respectfully traverse these rejections based on the following discussion.

**I. The 35 U.S.C. §101 Rejection**

Claims 1-21 stand rejected under 35 U.S.C. §101. As recommended by the Examiner and supported by the specification, the independent claims 1, 6, 13, and 21 are amended herein to reflect that the method of the invention is a "computer implemented" method in order to provide a technical embodiment to the claims.

**II. The Prior Art Rejections**

Claims 1-5 stand rejected under 35 U.S.C. §102(b) as being anticipated by

Kuribayashi, et al. (U.S. Patent No. 6,002,650), hereinafter referred to as Kuribayashi.

Claims 1-5 also stand rejected under 35 U.S.C. §102(b) as being anticipated by Hiroshige, et al. (U.S. Publication No. 2002/0095348), hereinafter referred to as Hiroshige. Claims 1-20 stand rejected under 35 U.S.C. §102(b) as being anticipated by Dietrich, et al. (U.S. Patent No. 5,630,070), hereinafter referred to as Dietrich. Claim 21 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Dietrich, in view of Milne, et al. (U.S. Patent No. 6,049,742), hereinafter referred to as Milne. Applicants respectfully traverse these rejections based on the following discussion.

#### A. Rejection of Claims 1-5 based on Kuribayashi.

In response to the rejection of claims 1-5 under 35 U.S.C. §102(b) based on Kuribayashi alone, Applicants respectfully submit that Kuribayashi does not anticipate the present invention in that it does not teach or suggest several of the patentable features of the independent claim 1. Specifically, Kuryibayashi does not teach or suggest providing restrictions on the use of substitute components to subsets of assemblies such that a substitute component may be substituted for an original component in a first assembly and may not be substituted for said original component in a second assembly. Nor does Kuryibayashi teach or suggest that these restrictions allow for multiple substitutions of the substitute components for the original components in the first assembly. Lastly, Kuryibayashi does not teach or suggest computing an optimal production plan in which the first assembly is produced with the multiple substitutions and the plan is optimized for manufacturing efficiency.

More particularly, Kuryibayashi discloses an execution method for mounting

components, not a production planning method. Kuryibayashi specifically discloses an execution method for mounting components on a board using a mounter 2 controlled by a control system 102. Kuryibayashi mentions (see figure 23, col. 9 lines 6-16, col. 11 lines 15-30, col. 28 lines 17-31 and claim 22) that during the process of mounting the components (which is controlled by a control system 102 ) substitutes components may be used "at an exhaustion of components". The control system 102 contains substitution data which may be used to determine if a mounted component is a substitute so that a further determination can be made as to whether or not the mounted component is appropriate. The appropriateness determination is made by an inspection of the components (e.g., by using an inspecting device, including an illumination device and a camera, attached to the mounter 2) (see column 27, lines 35-51).

Contrarily, the claimed invention is a computer implemented production planning method that computes an optimal production plan, using multiple substitute components, wherein the plan is optimized for manufacturing efficiency (i.e., uses the multiple substitute components in developing an optimal production plan). Specifically, as disclosed in paragraphs [0018-0019] and [0098-0099], the invention provides the following:

- (a) restrictions on use of the substitute components to specific subsets of assemblies;
- (b) that the restrictions may provide that a substitute component may be an appropriate substitute for an original component in a first assembly and may not be an appropriate substitute for the same original component in a second assembly; and,
- (c) the substitute components are used in place of original components to increase

or optimize manufacturing efficiency and the invention considers these rules to compute optimal production plans.

Additionally, as disclosed in paragraphs [0024-0026] and [0100], the restrictions in the form of mathematical expressions “provide for multiple substitutions of the substitute components for original components”, e.g., so that multiple substitute components can be substituted for multiple original components or so that the material substitutions can be in a ratio other than 1:1 such as when two substitute components are substituted for a single original component.

Although Kuryibashi mentions substitute components (as discussed above), it does not mention providing restrictions on the use of substitute components to subsets of assemblies, nor does it allow for multiple substitutions of the substitute components for the original components in an assembly. Lastly, Kuryibashi mentions in the cited paragraphs only that the substitute components are substituted for original components at the “exhaustion” of original components (e.g., see col. 28, line 26). Kuryibashi does not disclose that a plan is computed to use the substitute components during production in order to optimize manufacturing efficiency.

Therefore, independent claim 1 is patentable over Kuryibashi. Further, dependent claims 2 and 4 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

**B. Rejection of Claims 1-5 based on Hiroshige.**

In response to the rejection of claims 1-5 under 35 U.S.C. §102(b) based on Hiroshige alone, Applicants respectfully submit that Hiroshige does not anticipate the present invention in that it does not teach or suggest several of the patentable features of the independent claim 1. Specifically, Hiroshige does not teach or suggest providing restrictions on the use of substitute components to subsets of assemblies such that a substitute component may be substituted for an original component in a first assembly and may not be substituted for said original component in a second assembly. Nor does Hiroshige teach or suggest that these restrictions allow for multiple substitutions of the substitute components for the original components in the first assembly. Lastly, Hiroshige does not teach or suggest computing an optimal production plan in which the first assembly is produced with the multiple substitutions and the plan is optimized for manufacturing efficiency.

More particularly, Hiroshige discloses a technique for using an information system to provide a manufacturer with reusable parts for use in building or maintaining a product, not a production planning method. Hiroshige specifically discloses a method in which a supplier of reusable parts maintains a parts inventory and a parts specification database (see paragraph [0200]). If a specific reusable part is requested and not available in the inventor, the supplier can access the parts specification database, determine the specifications for the requested part and the find a compatible part having the same specifications (see paragraph [0200]).

Contrarily, as discussed above, the claimed invention is a computer implemented production planning method that computes an optimal production plan, using multiple

substitute components, in order to optimize manufacturing efficiency (i.e., uses the multiple substitute components in order to increase manufacturing efficiency). Although Hiroshige mentions substitute components (as discussed above), it does not mention providing restrictions on the use of substitute components to subsets of assemblies, nor does it allow for multiple substitutions of the substitute components for the original components in an assembly. Lastly, Hiroshige mentions, in the cited paragraphs, only that the substitute reusable parts are substituted supplied "when there are not applicable parts" in the inventory (e.g., see paragraph [0200]). Hiroshige does not disclose that an optimal production plan is computed to use the substitute components during production for optimizing manufacturing efficiency.

Therefore, independent claim 1 is patentable over Hiroshige. Further, dependent claims 7 and 9-11 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

### C. Rejection of Claims 1-20 based on Dietrich.

In response to the rejection of claims 1-20 under 35 U.S.C. §102(b) based on Dietrich alone, Applicants respectfully submit that Dietrich does not anticipate the present invention in that it does not teach or suggest several of the patentable features of the independent claims 1, 6, and 13. Specifically, Dietrich does not teach or suggest the restrictions of claims 1, 6, and 13 which allow for multiple substitutions of the substitute components for the original components in the first assembly. Nor does Dietrich teach or

suggest computing an optimal production plan to produce the first assembly with multiple substitute components, wherein the plan is optimized for manufacturing efficiency.

The claimed invention is broader in scope as compared to Dietrich. Specifically, Dietrich discloses a method for optimization of manufacturing resource planning (abstract) and mentions that "a product can be built using a part or resource other than the one specified on its BOM" (see col. 25, lines 8-10). However, the Dietrich invention is specifically "directed to the situation in which there is insufficient inventory of one or more of the materials, and possibly a lack of the requisite number of one or more of the resources, needed to accomplish the production run. In this situation, the constraints of inventory restrict the manufacturing process such that only a fraction of the desired numbers of the various end products can be produced. This forces the manufacturer to make a decision with respect to allocation of the available material and resources to provide the optimum number of each end product ..." (see 44-57). This is contrary to the present invention which computes an optimal production plan, using multiple substitute components, to optimize overall manufacturing efficiency, and which does not simply provide a method of optimizing resources with a one for one substitution in a situation where there is insufficient inventory.

Also, as mentioned above, Dietrich does not teach the restrictions of claims 1, 6, and 13 which allow for multiple substitutions of the substitute components for the original components in the first assembly, nor does it teach computing an optimal production plan to produce the first assembly with multiple substitute components, wherein the plan is optimized for manufacturing efficiency. Dietrich specifically mentions using "a part or resource" other than the one specified (i.e., a single

substitution, not multiple substitutions), and provides a constraint equation 15 to determine "optimal use of primary and substitute resources" (see col. 25 lines 35-40). Those skilled in the art will recognize that the constraint equation 15 calculates the total production of part j during time t as the sum of the production of part j without using a substitute for part i and the production of part j with using part f as a substitute for part i. However, the equation can only be correctly calculated for the total production of part j in the event that there is no more than one component part i being substituted, otherwise the total production of part j would be inflated. Thus, the equation does not allow for multiple substitutions. Additionally, while Dietrich discloses (see col. 26, lines 23-33) that the constraint equation 15 can be modified to reflect the additional cost or benefit incurred by using the a substitute part, those skilled in the art will recognize that a cost/benefit analysis alone does not determine manufacturing efficiency. For example, as mentioned in paragraph [0005], an optimal production plan may incorporate the use of substitute components, including excess unwanted inventory, resulting in more efficient utilization of capacity resources and ultimately impacts supply-chain metrics such as inventory position, on-time delivery, and capacity utilization.

Therefore, independent claims 1, 6, and 13 are patentable over Dietrich. Further, dependent claims 2, 4, 9-11, 14, 16-18 and 20 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

**D. Rejection of Claim 21 based on Dietrich in view of Milne.**

In response to the rejection of claim 21 under 35 U.S.C. §103 based on Dietrich in view of Milne, Applicants respectfully submit that Dietrich and Milne in combination do not make obvious the present invention in that they not teach or suggest several of the patentable features of the independent claim 21. Specifically, the Examiner indicates that Dietrich applies to claim 21 in the same manner that it applies to claims 1-20, that Dietrich (col. 34, line 52- col. 35, lines 63) teaches a subset of customers, and that the Milne is cited for teaching "a production/distribution planning method comprising substitute part numbers that can be used in place of original part numbers".

Therefore, the arguments set out by the Applicant above regarding Dietrich further apply to claim 21 and the newly added dependent claims 22-27. Furthermore, the Applicants submit that neither Dietrich, nor Milne teach a subset of customers. Specifically, neither Milne nor Dietrich teach or suggest modeling customer dependent substitutions "such that a substitute part number may be substituted for an original part number when used by said first customer and may not be substituted for said original part number when used by said second customer". In fact the cited portion of Dietrich (col. 34, line 52- col. 35, lines 63) simply provides a method for earliest ship date quoting for different orders without reference to different customers and without reference to substitutions or substitution restrictions. Additionally, while Milne teaches a production/distribution planning method and mentions that one part may be substituted for another, Milne uses a simple substitution scheme in which a part number is always substituted if it has no direct demand upon it (see col. 13, lines 25-27 and col. 15, lines

27-32). Neither different customers, nor overall manufacturing efficiency is considered by Milne.

Therefore, independent claim 21 is patentable over Dietrich in view of Milne. Furthermore, newly added dependent claims 22-27 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

## II. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1, 2, 4, 6, 7, 9-11, 13, 14, 16-18, 20, 21, and newly added dependent claims 22-27, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. Moreover, no new matter is added and all features recited in newly added claims 22-27 are fully supported by the specification as filed. Therefore, the Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,



Pamela M. Riley, Esq.  
Registration No. 40,146

McGinn & Gibb, P.L.L.C.  
2568-A Riva Road, Suite 304  
Annapolis, MD 21401  
Voice: (410) 573-0227  
Fax: (301) 261-8825  
Customer Number: 29154